

Jean-François Hennart

## Control in Multinational Firms: The Role of Price and Hierarchy<sup>1</sup>

### Abstract

- The paper uses principal-agent and transaction cost theories to analyze the concept of control in multinational enterprises in the framework of economic institutions of markets and firms which use the price system and hierarchy as methods of organizations.
- This theoretical framework is then used to analyze some of the relationship studied in the organization theory literature of the MNE.

### Key words

- The price system and hierarchy are substitutes, with the price system utilized in firms to overcome the basic flaws of hierarchy.

### Author

Jean-François Hennart, Associate Professor of International Business, University of Illinois at Urbana-Champaign, Champaign, Ill. U.S.A.

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## Introduction

How do firms manage to perform their functions efficiently? How do they constrain individual behavior to make it compatible with the overall goals of the firm? These age-old questions take on new significance in the context of the multinational enterprise (MNE) see for example Brooke and Remmers, 1970; Pralahad and Doz, 1981; Doz and Pralahad, 1981; Hedlund, 1981, 1986; Welge, 1987; Baliga and Jaeger, 1984; Egelhoff, 1988; Gates and Egelhoff, 1986; Bartlett, 1986; Bartlett and Goshal, 1989). In MNEs the problem of control is particularly acute. Geographical and cultural distance increase the cost of establishing control, and make it difficult for MNEs to secure the cooperation of foreign affiliates. Over-centralization of decisions leads to paralysis, while excessive decentralization results in chaos (Doz and Pralahad, 1981).

The issue of control in MNEs has elicited a considerable volume of empirical research. A recent survey of coordination mechanisms in MNEs lists 85 empirical studies undertaken since 1953 (Martinez and Jarillo, 1989). Yet, in spite of this significant effort, our knowledge of control mechanisms in firms remains fragmentary. For example Gates and Egelhoff (1986, p. 72) report that "researchers have generated inconsistent hypotheses . . . and reported inconsistent results" concerning one of the most salient issues, that of the determinants of centralization (the extent to which decisions are taken at the headquarters of the MNE).

The goal of this paper is threefold. First, I intend to sketch a theoretical structure that will clarify some of the concepts used in the study of coordination mechanisms in firms. One of the main building blocks of this framework is the distinction between *methods of organization* (the price system and hierarchy) and *economic institutions* (markets and firms) which use those methods. A second building block is the argument that the price system and hierarchy can be regarded as substitutes. The price system can be used in firms to overcome the basic flaws of hierarchy, while hierarchy can alleviate the most glaring defects of the price system. This theoretical framework will then be applied to some of the control issues studied in the organization theory literature of the MNE, such as the relationship between the degree of centralization and the extent of interdependencies between the parent and its foreign affiliates. I will show how the framework developed here explains some of the paradoxical results found in previous studies.

## A Theory of Economic Organization

The framework developed in this paper, based on Hennart (1982), draws from transaction cost and agency theory, but differs from both to some extent. It posits that organizations are designed to minimize the cost of organizing exchange and cooperation, and that competition in the product and factor markets leads individuals to organize themselves under the form of organization that minimizes these costs.

The major insight of transaction cost theory is that firms and markets are alternative institutions devised to organize economic activities. If one accepts this premise, then to understand the nature of organizational processes within firms one must ask two separate questions: First, what must be done to organize economic activities, that is, what are the tasks that both firms and markets must perform? Second, how do firms differ from markets in the way they perform these tasks?

### What is Involved in Organizing Economic Activities?

Economic institutions (such as firms and markets) exist to organize cooperation. Cooperation between individuals can be productive for two reasons. First, some tasks require more capabilities than can be provided by a single individual, and consequently can only be achieved by pooling efforts of more than one person. Individuals have also differing abilities, and cooperation through trade allows individuals to exploit those differences by making it possible for each to specialize in tasks for which he/she has a comparative advantage. In both cases the utility that individuals receive from cooperating exceeds what they could achieve through their solitary effort.

Although cooperation is productive, achieving it involves costs: these costs (which we call "organizing costs") arise from man's "bounded rationality" and from his "opportunism", i.e. his self-seeking behavior. Three tasks must be undertaken to achieve cooperation: (1) Individuals must be told that their interaction will be profitable. (2) The benefits from cooperation must be shared among the cooperating parties. Cooperators can be expected to invest resources to increase their share, an activity which may be rational from the individual's point of view, but which is wasteful in the aggregate because it reduces the benefits to be shared. The gains of cooperation must therefore be divided between the parties in a way that discourages bargaining. (3) The division of the gains of cooperation (the sharing rule) must be enforced. Failing this, cooperation could not take place or would not last. Achieving cooperation requires

◦ therefore carefully devised techniques that reduce information, bargaining, and enforcement costs.

In contrast to this view, neoclassical economics assumes that the three tasks that must be performed to obtain cooperation are performed costlessly by both firms and markets. What economists call “the theory of the firm” starts by assuming that this problem is solved (Alchian and Demsetz, 1972). In reality, and as argued above, all economic institutions experience costs in performing these three tasks. At any point in time, some potential gains of cooperation will be foregone because the gains from such cooperation are too small to warrant the establishment of institutions to organize it. Individuals will have to give up the gains of trade and specialization, and we will observe subsistence farming, self-insurance, and home production of clothing and food. The greater the potential gains from trade, the larger the amount of resources expended to achieve cooperation.

### **Prices and Hierarchy are Two Alternative Methods of Organization**

It is important at the outset to distinguish between “method of organization” and “economic institution”. The price system and hierarchy are alternative methods that can be used to organize economic activities. They are alternative in the sense that they use different coordinating mechanisms which result in different biases. Consequently, they entail, for a given interaction (transaction), different levels of organizing costs. Each mode will therefore have a comparative cost advantage in organizing a particular set of transactions.<sup>2</sup> Firms and markets are economic institutions. These institutions generally use a mix of both price and hierarchy, although the mix in firms is heavily biased towards hierarchy, while markets predominantly use the price system. As we will show, the choice between organizing a transaction within the firm or having it organized through the market (the make-or-buy decision) can be represented as a choice between using the price system and using hierarchy. Furthermore, the same analysis can be used to decide whether to organize an activity *within a firm* through prices or through hierarchy.

Let us first consider how the price system and hierarchy are viable ways of organizing cooperation. To simplify the exposition, assume that there are no transaction costs. This makes it possible to distinguish between the method of organization used and the actual performance of these methods of organization when organizing costs are positive.

We have seen that the organizing exchange and cooperation requires that individuals be informed of their interdependence, rewarded for cooperating, and discouraged from bargaining. Prices can perform these three tasks. Prices inform individuals about opportunities for cooperation. The information struc-

ture of a market is fully decentralized, with prices conveying to all participants information on every one else's needs and desires, allowing them to act in a way that maximizes social (and individual) utility.<sup>3</sup> Prices also act as sharing rules that allocate the gains from cooperation. When markets function perfectly (i.e. when there is a large number of buyers and sellers), these sharing rules become exogenous. Individuals do not have the power to change them, and bargaining is discouraged. For example, the gains obtained by having farmers specialize in food production and workers in the construction of farm machinery are divided between these two groups through food and agricultural machinery prices. Prices also meter and reward perfectly an agent's behavior. The gross rewards that individuals receive is directly function of their output times market prices.

In the absence of organizing costs hierarchy would also perfectly organize economic activities. We define hierarchy as a *method* or organization, and hence "hierarchy" is *not* synonymous with "firm" nor with "upper managers", as popular usage would imply and as defined in Hedlund's piece in this volume. Hierarchy as defined here is characterized by centralized information and the use of behavior constraints. While information is decentralized with prices, it is centralized with hierarchy. The hierarchical method of organization channels all the information possessed by individuals (employees) to a central party (the boss) who assimilates all this information, draws up consistent plans, and re-transmits information to employees in the form of directives. If individuals have "unbounded rationality", this method is as efficient in making optimal joint decisions as is the decentralized system of market prices.

In a price system individuals collect their own information, make their own productive decisions, and are rewarded by their output measured at market prices. By contrast, under hierarchy the individual relinquishes to a central party, the boss, his right to make decisions concerning the allocation of his own resources (such as his labor-time and effort), and instead agrees to do as told, within the constraints established by social custom. Why do employees agree to have their behavior directed by the boss? Because their reward under hierarchy is independent of their output. They are therefore less concerned about being ordered to perform tasks that do not seem to maximize their income than in a price system were their income is directly related to the tasks they perform. A hierarchical system does not reward employees by their output measured at market prices, but by their obedience to managerial directives. In other words, firms use behavior constraints to organize cooperation: employees are paid a fixed amount for following orders. Employees will be less concerned about the tasks they are ordered to perform than under a price system because they will not bear the full monetary consequences of poor decisions.<sup>4</sup> Consequently, it will be possible for the boss to assign tasks by fiat.

### **Markets and Firms in the Presence of Positive Organizing Costs**

In the real world, both the price system and hierarchy will experience costs in informing parties, in curbing bargaining, and in enforcing sharing rules. But because these two methods are fundamentally different, they will experience different levels of organizing costs for a given transaction. Let us first consider the costs incurred by a price system in informing parties, before turning to those involved in enforcing the terms of transactions.

#### *Information*

The price system communicates information to all interacting parties. That information must be necessarily be condensed, for otherwise the information needs of the system would be overwhelming. In a society consisting of  $n$  independent parties, organizing activities through prices requires  $1/2 (n^2 - n)$  two-way communication channels, as every individual must communicate with all others. By contrast, hierarchy only requires  $n$  two-way channels since all messages are channelled through a central party (Williamson, 1970, p. 20). Whenever price information has to be supplemented by complex descriptions, transferring information to all parties rises dramatically with an increase in  $n$ . As Arrow (1974) point out, prices are concentrated information: in one number is expressed all that is needed for parties to make the appropriate production and consumption decisions. But this presupposes that the characteristics of the goods are known to all. Knowing that grade A butter sells for 4 dollars a pound or that virgin aluminium grade P1020A costs 65 cents a pound is useful to guide behavior; knowing that cars are 50 cents a pound or that master paintings are 5 \$ the square inch is of little use because the latter two goods have an infinite variety of attributes. With bounded rationality, individuals will not have a perfect knowledge of the characteristics of goods transacted. Prices will no longer perfectly describe all of their relevant dimensions. In some cases, they may provide "wrong" signals that will mislead economic individuals, leading them to overconsume (underproduce) underpriced goods and underconsume (overproduce) overpriced ones.

When prices fail to act as efficient guides to behavior, a decentralized system may be efficiently replaced by a centralized one. A decentralized system requires individuals to gather all of the information they need. If the compact information provided by prices needs to be supplemented by extensive additional information, then centralizing information is efficient. It may be desirable for each individual to specialize in the collection of a limited type of information and to transfer the information to a central party, the "boss". The boss can then synthesize that information, make decisions, and send directives for execution. This is the essence of the hierarchical solution.

The benefits of hierarchy are especially noticeable in rapidly changing environments. Since information and decision-making are concentrated in the boss, decisions can be made by a single person. Decisions can be imposed on employees by fiat, because their income does not depend on what they are asked to do. The price system, on the other hand, rewards parties in proportion to their output. When the price system works perfectly, prices are exogenous and bargaining is impossible. In conditions of imperfect competition, however, prices are no longer exogenous, and parties to the exchange will resist changes detrimental to their interest unless they are fully compensated. Hence when the environment is changing rapidly, a real-world price system is at a disadvantage relative to a hierarchical system. The time spent communicating the information to all concerned and resolving disputes may be such as to make adjustment of new conditions impossible: by the time an agreement is reached, further adjustment may be needed. By contrast hierarchy allows the boss to quickly respecify the system through fiat (Williamson, 1975).<sup>5</sup>

There are, however, two major problems with the hierarchical solution. First, information collection and decision-making are dissociated. In a price system individuals can be expected to use the idiosyncratic information they have acquired in the course of their activities to increase their income (Hayek, 1945, p. 521). Under hierarchy employees have less incentive to become informed and to transmit to the boss information on how to maximize their employer's income because they will not be directly rewarded for doing so.<sup>6</sup> Even if employees faithfully transmit everything they observe, information can be lost as it is transferred across hierarchical levels. The information loss may be voluntary or involuntary. Involuntary distortion results from encoding/decoding gaps (Williamson, 1970). Involuntary distortion occurs because employees can be expected to distort information in ways that benefit them. With a constant span of control, an increase in the size of the firm will result in more hierarchical levels. The larger that number, the higher the information losses incurred by hierarchy.

### *Enforcement*

Prices provide appropriate signals to guide behavior if they reflect the social value of goods and services. In reality, bounded rationality makes it costly to measure outputs. It will not pay for market traders to measure outputs perfectly because better measurement incurs increasing costs. Traders will invest in measurement up to the point where its marginal cost is equal to its marginal benefit. Consequently market participants will be able to alter the terms of trade to their advantage without a corresponding loss of revenues.

Consider a farmer that contracts for a fixed price to have fertilizer spread on his field. One important dimension of performance is the uniformity of applica-

tion. If the fertilizer has not been uniformly applied, the crop in some parts of the field may suffer burns while in others it may fail to grow. Since an even application of fertilizer takes more time and effort than an uneven one, a subcontractor paid a fixed amount for the job will be incited, if detection is costly, to apply fertilizer in a quick, and therefore uneven way (Roumasset and Uy, 1980). To protect against this eventually the farmer could carefully measure performance. He could sample parts of the field after application and calculate the weight of fertilizer per square yard. This, however, is likely to be very costly since the fertilizer may dissolve quickly into the ground.<sup>7</sup> In this case, the cost of using the price system is the cost of measuring performance plus the cost due to cheating (the cost to the farmer of a reduced crop due to uneven application). More generally, high measurement costs will make it possible for individuals to cheat. Individuals will supply too little of what is desired and too much of what is not. Hence the costs of a price system (from the point of view of the reward function) will be the cost of measuring output plus the cost of cheating that will result from imperfect measurement. We call these "cheating" costs.

Where the cost of measuring output and the consequences of imperfectly doing it are substantial, as in the case above, it may be cheaper for both parties to use a different method of organization, hierarchy. Rather than expend resources to measure output in all of its dimensions, it may be desirable to change the behavior of individuals by reducing the incentives they have to cheat. This can be done by breaking the connection between output and rewards. In our case, the farmer can hire the subcontractor who applies fertilizer and promise him a fixed sum of money per unit of time, on condition that he follows his orders. Since his salary no longer depends on his output per unit of time, the farm hand has less incentive to spread fertilizer unevenly.

One unavoidable consequence of this decoupling of output and reward is that, while it reduces cheating, it also reduces incentives to work. A self-employed individual who slacks or decides to take the day off pays the full cost of his behavior in the form of reduced income. Because his reward is no longer tied to performance, an employee will have incentives to shirk, to break the promises he made to obey managerial directives. How much shirking will take place will depend on the extent to which the employee's objectives differ from those of the boss. If effort is painful, employees will have incentives to reduce the effort they devote to their tasks. More generally, employees who shirk will act differently from what they would do if they were self employed. Note that shirking does not necessarily mean loafing: it can involve doing the work too well. Bosses will therefore have to expend resources to direct and monitor behavior. In our example, the farm hand will have fewer incentives to exercise effort to get the job done as quickly as possible if he is paid on a time basis than if he is paid by the task. Because of diminishing returns to monitoring, it will not be profitable for the farmer to eliminate shirking completely, and some residual amount will



remain. As a result, "shirking costs" are the sum of the costs of monitoring behavior and of those of bearing the residual amount of shirking.

### **From Method of Organization to Economic Institutions**

The argument so far is that prices and hierarchy are two alternative methods of organizing economic activities. The solutions they provide to the problem of information, bargaining, and enforcement are radically different. While hierarchy centralizes information, the price system decentralizes it. A decentralized information structure avoids the losses due to information transfer, but it experiences problem of suboptimization if prices do not provide the "right" information. Hierarchy's solution is to centralize information, but this reduces the incentives individuals have to collect information and can also lead to information loss.

The price system also solves the problem of rewarding useful behavior in a way that is quite different from that used by hierarchy. The price system motivates individuals to maximize output, but the system's efficiency is limited by the cost of measuring output in all of its dimensions: individuals can be expected to cheat, underproducing those dimensions of output which use positively priced inputs.<sup>8</sup> Hierarchy solves the problem of cheating by decoupling reward from (market-measured) output, but this solution requires control of behavior. Since such control is costly, it generally will not pay to monitor perfectly, and employees will relax their effort (they will shirk).

Because the price system and hierarchy provide different methods of organizing economic activities, they tend to result in different levels of organizing costs for a given transaction. In our previous example, measuring the quality of the output (the evenness of fertilizer application) costs more than specifying and monitoring behavior (how the fertilizer should be and is applied). In that case, the farmer will hire an employee to spread the fertilizer rather than use the market to contract for that task. Inversely, the price system will be used when output is relatively easy to measure, but behavior is difficult to direct and monitor. Such would be the case from home workers, who toil in dispersed locations and are therefore costly to supervise.

So far we have described two methods of organization, the price system and hierarchy. What is the relationship between these two methods of organization and the economic institutions of firms and markets? A simplistic answer is that firms are institutions which use hierarchy, while markets use price signals. In fact, both firms and markets use a mix of both methods of organization for reasons shown below. However, the example of fertilizer application shows that the essence of firms is the employment relationship, i.e. the imposition of behavior constraints. It is by imposing behavior constraints (and simultaneously

relaxing price constraints) that the cost of uneven application of fertilizer is reduced. Hence the use of hierarchy (behavior constraints) is the distinguishing mark of firms. The use of pure employment contracts, in which the employee is rewarded entirely in function of his obedience to managerial directives, is widespread in firms.

Because the level of shirking may grow in some activities more than proportionally as behavior constraints replace price constraints, the firm may then introduce price constraints alongside behavior constraints within the employment relationship. Consider the sales function. Commercial success requires coordination between the manufacturer and his sales force. There are two main ways to achieve this coordination: the firm can either use the price system (contract with sales representatives paid on the value of sale made) or use hierarchy (hire employees paid on a time basis). The choice between those two options depends on the comparison of two types of cost: sales representatives will maximize effort to "move the goods", but may also fail to supply outputs that manufacturers find costly to measure, such as customer service (Anderson and Oliver, 1987). When the latter is important, firms rely on employees to do the selling. Because their salary is now independent of performance, these employees will probably be less energetic in making calls. If the cost of curbing shirking is very high, paying employees in part through commissions can increase their incentive to make sales calls and may provide a cheaper method of control than hiring additional supervisors to monitor their behavior. Hence a mix of both modes of organization may be, in some instances, the least cost way of organizing the sales function. Firms generally use a mix of price and behavior constraints which varies with the nature of the tasks involved. What defines the firm if a relatively heavy emphasis on behavior constraints; markets, on the other hand, are characterized by the predominant use of price constraints.

## **Control Processes within Firms**

This section describes in more detail the control processes used in firms. The discussion will focus on the relationship between the employer and the employee, first at the task level, then at that of the subsidiary.

### **Control of Employees**

In the hierarchical method of organization, the boss tells employees what to do and rewards them in function of their obedience to orders. Since employees are

paid a fixed amount, the information they collect in the course of their work no longer benefits them directly. Because of this reward structure, employees can be expected to be less motivated than self-employed individuals to gather and to make use of relevant information. Hence to be able to voice or draft clear directives to guide their behavior the boss needs to know what the employee must do to generate the desired output. In other words, bosses must know the employee's production function. In some cases bosses can acquire this knowledge if they spend the necessary resources. In others, directives for the effective execution of tasks cannot be drafted in advance, for efficient production requires situation-specific decisions. In Ouchi's (1979) terminology, tasks are not "programmable."

The extent to which the boss knows (or can know) the employee's production function together with information on the relative level of shirking costs vs. cheating costs can be used to categorize the various types of control mechanisms used in firms. Table 1, adapted from Ouchi (1979), summarizes the argument. Firms can use three types of control, depending on the degree to which management has an information advantage over employees, and on the level of shirking costs relative to cheating costs.

Cells 1 and 2 correspond to behavior control. As argued above, this method of control is useful when all dimensions of performance cannot be easily specified ex ante and measured ex post, so that rewards based on outputs would generate high cheating costs. It may then be cheaper to control behavior. There are, however, two ways of imposing behavior control. The first one is the method described so far, hierarchical control (cell 1). Hierarchical control consists in explicitly telling employees what to do, and in observing their behavior to ascertain that they are following orders. This control can be exerted personally by the boss, or impersonally through bureaucratic rules and regulations (what Child (1973) has called a "centralizing" and a "bureaucratic" strategy of control). In a fundamental sense, those two modes of control are similar: they aim at specifying behavior, i.e. *how* employees must act. Hierarchical control will be used when two conditions are met: the employer knows well the em-

**Table 1.** Employee Control modes used in firms

Cheating costs/ shirking costs	Management knowledge of the worker's production function	
	Higher than workers	Lower than workers
High cheating low shirking	1. Hierarchy	2. Selection and/or socialization
Low cheating high shirking	4. No interaction within the firm	3. Price control (e.g. piece work)

Adapted from Ouchi (1979).

employee's production function, and the cost of shirking is less than that of cheating. For example, machine-paced processes, such as assembly lines, make monitoring easier, because the productivity of the employee is indicated by his behavior. Using piece rates on assembly lines would be dysfunctional because workers would fail to cooperate and would abuse the machinery. Additionally, the same time, assembly-line processes make it difficult to separate the productivity of one employee from that of the others. Firms tend therefore to use hierarchical control for such processes.<sup>9</sup> The costs of using hierarchical control are likely to rise dramatically with geographical dispersion, which raises monitoring costs, and with idiosyncratic tasks, because how to perform these tasks cannot be specified *ex ante*.

In some cases, workers have an information advantage over management, and output is difficult to measure and price in all of its dimensions, a situation characteristic of "professional" work (cell 2). Efficiency requires that employees be left free to make production decisions, yet output is difficult to measure. The solution then consists in aligning the objectives of the employee and those of the employer. This can be accomplished by (1) selecting employees who have the same goals as management; (2) investing resources in persuading employees who may have different goals to internalize the employer's values so that they act without external constraint in the employer's best interest (Ouchi, 1981, pp. 414–415).<sup>10</sup> These two strategies are often combined.

The first of these two strategies makes direction and monitoring unnecessary since employees will perform as required out of their own self-interest. An example would be to hire student athletes to do maintenance work; they would exercise anyway, but now they are paid for it (Pratt and Zeckhauser, 1985). Firms can also attempt to persuade employees with divergent goals, through indoctrination and socialization, that "what they want to do is the same as what they have to do" (Kanter, 1972, p. 1; see also Van Maanen, 1975). If the firm is successful, employees will voluntarily choose not to shirk. This method, which Baliga and Jeager (1984) call "cultural control", economizes on information and monitoring costs.<sup>11</sup> Socialized employees need not be monitored, and they do not have to be given specific answers to specific problems: they only need to be inculcated with the goals or philosophies of the organization. They can deduce from these the rule appropriate for any situation (Ouchi, 1981, p. 421). Because the employee is given a general rule to guide his behavior, he has no need to seek orders from his superior in unexpected circumstances. Hence the system is much more flexible than hierarchical control. Because employees now espouse management's goals, few resources need be invested to measure performance or to monitor behavior. Rewards can be tied to the dedication of the individual to the group and to his or her length of service, facilitating further socialization.

Worker selection and indoctrination involve very substantial up-front costs. Compared to hierarchical or price control, more resources must be devoted to

selection, to training, to communication, and to social interactions, so as to impact the philosophy of the firm to the new recruits. Socialization strategies can be cheaper to implement if employees are recruited from a culturally homogeneous society. Investment in selection and socialization will pay off only if the employee remains with the firm for an extended period. This, and socialization in general, tend to create an inbred group of employees, intolerant of differences, and unreceptive to outside ideas, increasing the risk of "group-think" (Janis, 1972). Creative types do not do well in socialized organizations, as shown, for example, by the difficulties experienced by IBM in developing in-house software (Depke, 1989).

In both cells 1 and 2, the employer exercises behavior control: explicitly in the case of hierarchical control, implicitly through internalization in the case of socialization. The third type of control (cell 3) is output-based, in the sense that the reward of the employee directly relates to his output, but not to the way he has achieved it. We call this price control. This mode of control is efficient when the employee's knowledge of his production function is better than that of the boss and when all dimensions of employee performance are easily measurable. Directing the behavior of the employee and rewarding him for following orders would be inefficient in that case, since the employee knows better than the boss how to achieve management's goals. The employee will be more productive if left free to choose the best course of action and if his shirking is curbed by reintroducing a market mechanism linking rewards to outputs. This type of control takes the form of bonuses, piece work, and commissions.

The benefit of using price controls within firms is that, given positive monitoring costs, they elicit greater effort.<sup>12</sup> They also harness the capabilities and the knowledge of the employee, and make control possible without the need for management to know the production function and to closely monitor employees. Output-based rewards thus save on managerial capabilities. Unfortunately, unless all dimensions of performance are measured and priced (or constrained), maximization of effort may also lead to maximization of unwanted side-effects.<sup>13</sup> For example, paying piece rates for "picking" crabs (for extracting their meat) will incite workers to extract only the easy-to-remove back meat and to leave claw-meat in the shells. This tendency is easily checked by weighing the picked shells and deducting from the picker's earnings a penalty proportional to the weight of the shells. This discourages pickers from leaving too much meat in shells. In this case, the ability to control suboptimal behavior makes it possible to use piece rates. On the other hand, application of fertilizers on fields is done on a time-wage basis under hierarchical control because it is difficult to determine whether or not the chemicals have been applied uniformly, and because the consequences of uneven concentration can be substantial (Roumasset and Uy, 1980).

Finally, it should be noted that the relative cost of using each form of control will vary across transactions within a given firm, and not just across firms, as the characteristics of tasks change. Thus employees in some departments of a store may be paid through commissions (price control) while others receive a straight salary (hierarchy).

### Control and Subsidiaries

The analysis just presented can be used to explain not only the pattern of control over individuals, but also control at the level of the firm's subsidiaries (Table 2). If the performance of the subsidiary is difficult to gauge, and headquarters (HQ) knows better than the subsidiary what has to be done, then hierarchical control will be implemented (cell 1). Decisions will be made by HQ and the subsidiary will be told what to do. If HQ goals can be internalized by the management of the subsidiary, then control can be achieved through socialization (cell 2). Bartlett and Goshal (1989, pp. 163–164) describe how Unilever, like many Japanese MNEs, uses socialization as its main control mechanism. As an alternative, control can be achieved through prices by setting up the subsidiary as an independent profit center (cell 3). By choosing appropriate internal transfer prices, the firm can elicit the same behavior as it would through direct behavior control. If output is measurable, and HQ has less knowledge than the subsidiary manager on how to achieve the desired outcome, then letting subsidiary managers free to maximize the subsidiary's profits, and rewarding them as a function of those profits, will achieve better results than specifically directing their behavior with directives from HQ. Then local managers will be incited to make use of their specialized knowledge for the benefit of their subsidiary, and thus for that of the firm. In addition to control advantages, establishing the affiliate as a profit center has also informational advantages over hierarchical control, since it relieves HQ from having to learn how to operate locally, and economizes on the amount of information that has to be sent to and received from affiliates. Transfer prices take the place of frequent complex directives, and the profits

**Table 2.** Subunit Control modes used in firms

Cheating costs/ shirking costs	Headquarter's knowledge of the unit production function	
	Higher than local management	Lower than local management
High cheating low shirking	1. Hierarchy "centralization"	2. Selection and/or socialization
Low cheating high shirking	4. No interaction within the firm	3. Profit centers

achieved by the subsidiary serve as the single yet all-encompassing measure of performance and the basis of the manager's rewards.

The practical problems and limitations involved in setting up price controls provide a good illustration of their costs and benefits and show why their use in firms is necessarily limited. To maximize their personal income, managers will maximize the profits made by their units. In the process, they will maximize the use of underpriced inputs or the generation of underpriced outputs (as was discussed above). For example, if the impact of the subsidiary's reputation on that of the firm cannot be quantified by HQ, and if the rewards of subsidiary managers depend only on the annual profits made by the unit, then they can be expected to engage in activities that maximize yearly profits even if those activities damage the firm's reputation. To make a price system an efficient method of control all inputs and outputs used and produced by the profit center (including intangibles such as reputation and experience) would have to be correctly priced to reflect their cost and benefit to the firm as a whole.

Our model has shown that perfect pricing is an impossible task. If all interactions between the firm's subsidiaries could be priced, then there would be no benefits to intra-firm organization. Activities are internalized within firms because market prices fail to organize at least one of the interdependencies. So not all intrafirm interdependencies can be correctly priced. Incorrect pricing of inputs and outputs will induce managers to suboptimize. Suboptimization is equivalent to "cheating" as defined above: it means that employees will take advantage of the imperfection of the system used to measure their output.<sup>14</sup> To check for generation of unwanted side effects, and to encourage the production of desirable ones, HQ will complement transfer prices with hierarchical constraints designed to organize unpriceable interdependencies. A subsidiary manager may be told to maximize profits, but he will have to follow specific rules concerning ethical behavior, worker safety, pollution control, employee turnover, etc. However, as more and more hierarchical constraints are introduced, the advantages of profit centers will decline. HQ will have to expend costly resources to send more directives to the subsidiary and to collect more information on compliance. Subsidiary managers will see their autonomy decline, decreasing their incentive to work hard and show initiative. They will shirk more. Both the informational simplicity and the motivating virtues of profit centers will be lost.

We would expect the relationships between HQ and subsidiaries to be a mix of the three control techniques described above, and to vary with HQ's knowledge of the subunit's environment and the degree to which interdependencies between the parent and the subsidiary can be measured and constrained through prices. Non-priceable interdependencies organized through price controls will lead to cheating (suboptimization). On the other hand, imposing hierarchical constraints lowers the incentives that subsidiary managers have to show initia-

itive. The optimum control system should balance those two sources of cost, shirking and cheating (suboptimization).

### Some Observations on the Model

How does the model developed above compare with agency theory and with organization theory approaches to the problem? In contrast with some agency models (Eisenhardt, 1985), the model presented here makes no assumptions about differences in risk aversion between the employer and the employee, and consequently does not address the risk-bearing consequences of control strategies. The model also diverges from agency theory in specifying the cost of control as the sum of the resources spent to impose a particular method of control plus the cost of the unwanted side-effects that result from using this method.

In contrast to organization theory (OT) which emphasizes the information aspects of control (Galbraith, 1973; Egelhoff, 1988), the model emphasizes its reward aspects. This difference in emphasis is particularly important in the case of "price control", an important component of our model which is downplayed in the OT literature.<sup>15</sup> Martinez and Jarillo's (1989) review of the OT literature on control lists the eight most common mechanisms of intrafirm coordination identified by OT researchers. Price control, as defined here, is not cited.

The neglect of price control is surprising, given its extensive use in firms. About one-quarter of all workers in U.S. manufacturing industries in the mid-1970s (and 23 percent of all farm labor in 1959) worked under some type of incentive systems (Seiler, 1984). Even at upper management levels, incentive in the form of bonuses made up 31 percent of the total compensation received by executive Vice Presidents in 1986 (Reibstein, 1987). Many firms also see in price controls the remedy for "bureaucratic failures", i.e. "shirking". The recent trend has been towards increased use of price controls in the form of "intrapreneurship" schemes and of a generalized commission schemes in department stores (Dunkin, 1989).

Although Martinez and Jarillo do not mention price control, they do list output control, which they define as "based on the evaluation of files, records, and reports submitted to corporate management", and which they equate to "bureaucratic control" (Child, 1973). "Output control" may resemble price control, but there are important but subtle differences between the two. Egelhoff (1988), in a very thorough study of control mechanisms in MNEs, determined the extent of output control by measuring the frequency with which a number of performance measures (e.g. sales to specific accounts or inventory levels) had



to be sent to HQ. This concept differs significantly from “price controls”. Although price controls are a form of output controls, since a price system rewards output, not all output controls are price controls. Price controls establish a clear link between rewards and output. They insure that the agent will not shirk and will use his privileged knowledge to the employer’s advantage. They are informationally economical because they save the employer from having to collect extensive information on the employee’s production function. Output controls can differ from price controls for two reasons. First, some organizations collect output measures which have no direct influence on rewards, and hence on employee motivation. Second, the term output control is sometimes applied to intermediate outputs. Observing the levels of many intermediate outputs approximates monitoring behavior. For example, HQ may ask a subsidiary manager to report the level of salaries for its sales department and may intervene if the manager fails to cut the overall wage bill by 10 percent by the time of the next report. This is tantamount to telling him outright to cut the wage bill by 10 percent – the straight behavior control method. Thus the way organization theorists have defined output controls leads some to consider behavior control and output control as complements, while in our model (and in agency models) they are substitutes (Eisenhardt, 1985).<sup>16</sup>

One important limitation of the model developed in this chapter is the lack of a time dimension. The model is implicitly a one period model. No consideration is given to experience rating in firms and in markets. For example, repeated observation of the behavior of employees increases the employer’s ability to control shirking. Similarly, market traders who expect continuation of the relationship may restrain from cheating so as not to jeopardize future dealings.

### Application to Multinational Firms

The three control techniques of hierarchy, socialization, and price control are used in varying proportions by MNEs to control their foreign subsidiaries. Hierarchical control over subsidiaries is exercised through visits from HQ personnel to the subsidiary and/or from subsidiary managers to HQ, written and oral directives sent to the subsidiary, and requests for information. When communication costs are high, socialization strategies may be the only way to control far-flung subsidiaries. In the olden days, family members were sent abroad with full authority to manage the foreign arm of the business. Later, these family members were replaced by a small corps of trusted home-country managers (e.g. the “Dutch Mafia” of Philips), who ran the subsidiaries. Increasingly, socialization is being used to develop a corps of both home-country and

foreign country nationals (Edstrom and Galbraith, 1979). Bartlett and Goshal (1989, ch. 10) document the efforts of some MNEs to create such a cadre through extensive training and job rotation.<sup>17</sup> Lastly, MNEs often set up subsidiaries as profit centers and reward their managers on the basis of the profits of their subsidiaries.

### **Cost and Mix of Methods of Control for Foreign Subsidiaries**

Extending our model to the MNE raises two main questions. First, how does doing business across national boundaries affect the level of organizing costs? Second, how does it affect the mix of control mechanisms used?

For reasons discussed below, each of the three control modes will be more costly to implement in an international than in a domestic setting. Consequently, the lowest-cost mix of modes used to control foreign affiliates will be more costly than that used of for domestic subunits.

Hierarchical control will be more expensive to implement internationally than domestically because geographical distance makes behavior more difficult to observe. Cultural differences make communication more costly: the need to be explicit and the chances of distortion are greater. Furthermore, foreign environments are likely to be substantially different from domestic ones so that employees positioned in foreign countries will have a substantial information advantage over HQ, making centralized direction more inefficient. In fact, up until recently, the length of time it took to refer decisions to HQ and receive an answer made centralization an extremely costly proposition, and led MNEs to rely heavily on "on the spot" decisions.<sup>18</sup>

Operating internationally also increases the cost of socialization. Hofstede (1980) has documented the presence of significant national differences in beliefs, behaviors, and attitudes concerning work. Those differences must be bridged when doing business abroad. The cross-cultural interface can be set at various levels. If locally-hired managers run the foreign subsidiary the cultural barrier lays between HQ and subsidiary managers. The cultural homogeneity of the management corps can be kept intact by sending expatriates to run the foreign subsidiary. This shifts the cross-cultural interface from the parent-subsidiary level to within the subsidiary, between the local labor force and the expatriate manager. Using expatriate managers makes it possible to socialize the management corps, but it shifts the cross-cultural problem at the subsidiary level: using expatriates tends to damage relationships with local suppliers, customers, and host country governments. Local employees may resent expatriates because they receive higher pay and fill positions to which they would otherwise be promoted. Running the subsidiary with local managers, on the other hand, will automatically raise the costs of socialization by diluting the homogeneity of the employee

pool. Thus imposing explicit or implicit behavior constraints costs more internationally than domestically.

The costs of using price constraints would seem to be less affected by distance. As argued earlier, prices are very condensed signals. (The cost of communicating prices is not much greater across countries than within a country. Ouchi's finding (1978) that quantitative measures of output are less subject to distortion than qualitative measures of behavior when transmitted across hierarchical levels, supports this view.<sup>19</sup>

If it is true that internationalization increases the cost of imposing behavior constraints more than that of setting price constraints, then interactions that would be organized within firms in a domestic context will be handled through the market (or not at all) when they involve agents located in more than one country. (Although this proposition has not been empirically tested, there is some evidence that the use of market processes to exploit knowledge is much more common internationally than domestically.) In their study of licensing contracts, Caves, Crookell and Killing (1983) noted that licensing was much more frequent internationally than domestically.<sup>20</sup>

Our assumptions about control costs also imply that the mix of techniques used to control foreign subsidiaries should be biased towards greater use of price control than that used for domestic subsidiaries. One testable implication is that a greater proportion of foreign than domestic subunits should be run as profit centers. This too is an area in need of empirical verification.

### Centralization and Interdependencies

The explicit consideration of the full menu of methods of control used in firms could help explain some of the conflicting results found in the study of organization processes in MNEs. Consider first centralization and its determinants. Centralization is one of the fundamental dimensions of the design of large organizations. It refers to the extent to which HQ makes decisions – what we have called hierarchical control. Organization theorists have argued that interdependency among the subunits of the organization constitutes an important determinant of centralization (Van de Ven, Delbecq and Koenig, 1976; Tushman and Nadler, 1978). According to Egelhoff, interdependencies increase the need for information processing. Centralizing decisions at HQ is one way to tackle this increased information load, as “centralization provides coordination and integration across the interdependency” (Egelhoff, 1988, p. 131). Hence the extent of centralization in MNEs should be correlated with the degree of interdependence between the subsidiary and the rest of the organization.

Egelhoff tests this hypothesis by calculating the degree of centralization of decisions in marketing, manufacturing, and finance, and correlating centraliza-

**Table 3.** Correlations between Centralization Scales and Strategic and Environmental Conditions

Measures of Interdependency	Centralization in		
	Marketing	Manufacturing	Finance
Marketing information dependence	0.21*	0.24*	0.10
New manufacturing information dependency	0.01	0.14	-0.19
Day to day manufacturing information dependency	0.11	0.15	-0.06
New product design dependency	-0.10	0.16	-0.25**
Product design change dependency	0.10	0.27**	0
Intracompany purchases by subsidiary	0.08	0.14	-0.24*
Intracompany sales by subsidiary	0.27**	-0.01	0.24*
Sales dependence	0.11	0.03	0.19*
Size of subsidiary (sub size/parent size)	0.19	-0.19	0

Source: Egelhoff, 1988, Table 7-2.

tion with nine measures of interdependency. As shown in Table 3, the results are mixed. Of the potential 27 correlations between the degree of centralization and the extent of interdependencies, only six are significant at 0.05 (one-tailed test) and have the right sign (two are significant, but are incorrectly signed).

The theory proposed in this paper suggests some explanations for these results. Egelhoff argues that efficiency requires that all types of interdependencies be organized through centralization of decision-making at HQ. The model we have sketched suggests, however, that not all interdependencies require coordination through hierarchical control. Exercising behavior control from HQ requires collecting a tremendous amount of information on local conditions and on the extent to which managers of foreign subsidiaries follow orders. If some interdependencies can be mediated through prices, HQ will economize on the need to gather information and to monitor behavior. HQ needs only to specify appropriate prices to govern interfirm interdependencies, and let the subsidiary operate as a profit center. Centralization will be low even though control may remain high. Only interdependencies HQ cannot easily price will be organized through direct behavior control. For example, HQ is unlikely to make operating decisions for the subsidiary, such as how to price its products, unless it purchases these products from the affiliate (creating interdependencies) and there are no existing market prices to guide the transfers (i.e. the interdependencies are not priceable). Dependencies that are priceable include intracompany transfers of commodity materials and of standard technical knowledge. On the other hand, a subsidiary's use of a parent's trademark or of its guarantee in borrowing funds is difficult to price; hence, the parent will find it desirable to establish procedures to be followed by the subsidiary to maintain the quality associated with that trademark and to specify the uses to which borrowed funds must be committed, i.e. HQ will impose behavior constraints on the subsidiary manager.

Another factor weakens the link between centralization and interdependencies. As argued above, behavior control can be explicit (hierarchical control) or implicit (socialization). An MNE faced with interdependencies which cannot be organized by prices need not resort to hierarchical control (centralization): it can instead socialize subsidiary managers so that their decisions align with those that would be made by HQ. Hence the connection between interdependencies and centralization is not as direct as hypothesized by Egelhoff. Price control and socialization can act as substitutes to centralization. That Egelhoff found few correlations between centralization and measures of interdependency may reflect reliance by the MNEs he studied on these methods of nonhierarchical control.<sup>21</sup>

### **Autonomy of Affiliates**

Our theory of MNE control also throws light on the concept of autonomy of foreign affiliates. Researchers typically measure autonomy as the locus of decision-making: if HQ makes the decisions, the subsidiary is said to have little autonomy (Hedlund, 1981; Welge, 1987). The concept is clear, but its interpretation is more ambiguous. Decisions made by a perfectly socialized manager may be undistinguishable from those made at HQ. This will also be true for those made by an "autonomous" manager responding to a correctly specified system of transfer prices. Autonomy measures the relative use of hierarchical control (Table 2, cell 1) as opposed to socialization (cell 2) and price control (cell 3). But it does not necessarily reflect the subunit manager's degree of responsiveness to local conditions and to the needs of local stakeholders.

### **Is Decentralization Desirable?**

The explicit consideration of price controls in firms also suggests new ways of looking at modern management methods. Consider the following parallel between profit centers and piece work schemes. Both have the same goal: to motivate the employee to apply effort and initiative when output is relatively easy to measure and the employee has an information advantage over management. Yet while decentralizing management to subsidiaries and rewarding their managers on the basis of subsidiary profits (setting up a multidivisional structure) has generally been considered a major advance in management (Chandler, 1966; Williamson, 1975, 1985), the piece rate system has been seen in a very different light. Piece rate schemes have been said to "absolve managers of the responsibility and costs of exploring, designing, and supervising craft labor processes, which are typically complex and arcane" (Brown and Philips, 1986).

This was certainly the point of view of Taylor and his Scientific Management schemes aimed at replacing price controls by behavior controls. This required management to invest in knowing the worker's production function (through time-and-motion studies) but the payoff was a significant increase in productivity (Edwards, 1979). This suggests that decentralization, especially if it consists in having locals run the MNEs' foreign subsidiaries, may be a way to avoid learning how to operate in foreign countries, a way to avoid management. If so, the recent decline in the use of expatriates by U.S. MNEs, a decline which has been attributed to the inability of U.S. managers and of their families to adapt to conditions abroad (Kobrin, 1988), may reflect the inability or the unwillingness of American MNEs to compete in increasingly global industries.

## **Conclusion**

Organizing economic activities to capture the gains from joint effort and/or from specialization constitutes the main task of all economic institutions. Firms and markets are two broad types of institutions devised to perform these tasks, and they therefore face similar problems in achieving their goals. Because in liberal societies individuals are free to choose the institution that will organize their interdependence, the use of firms to organize economic activities will hinge on their relative efficiency vis-à-vis markets. A theory of the methods of control used in firms must therefore be able to explain why firms are more efficient than markets. It must be a general theory of organization.

This chapter develops such a theory. The theory explains both the advantages and the drawbacks of firms as ways to organize economic activities. The same factors which explain why firms are chosen over markets also account for the relative mix of mechanisms of control used in firms. Framing the study of the control processes used in firms in this broader perspective has two main advantages. First it allows us to consider the full range of control mechanisms used in firms (including price controls, which have been curiously downplayed in organization theory). Second it explains how and why these mechanisms are combined in firms so as to minimize organization costs. The theory helps explain some of the paradoxical results found by researchers studying control processes in MNEs and advances a number of testable propositions.

## Notes

- 1 An earlier version of this paper was presented at the workshop on Organizational Theory and the Multinational Corporation at INSEAD on September 1–2, 1989. I thank Yves Doz, Gunnar Hedlund, John Kimberly, Steve Kobrin, Guido Krickx, Andy Van de Ven, Keith Weigelt, Sidney Winter, and especially Kathleen Saul, for their helpful comments.
- 2 If one assumes some degree of competition, one can expect the most efficient mode to dominate the less efficient one, and thus the mode actually chosen to organize the transaction should match that predicted by this theory. The model is thus applicable to those cases where institutions are not sheltered from competition by collusion or government intervention. It has, therefore, greater applicability in competitive industries than in government bureaus.
- 3 Note that they do it “in complete disregard of the decision of others, or even the existence of others” (Demsetz, 1988). This is because prices reflect perfectly the social consequences of each agent’s actions.
- 4 Since poor decisions may result in the disappearance of the firm, employees will bear some of the consequences if they have firm-specific skills and if the costs of moving to another firm are high.
- 5 This explains why democracies tend to delegate power to the executive branch in times of war.
- 6 Indeed, in some firms they may be punished for bearing bad news.
- 7 To simplify the exposition I am abstracting here from reputation effects. With bounded rationality, the probability of losing reputation due to dishonest behavior will never be 1, and can in fact be remarkably low. In some cases, however, reputation effects may be high enough to discourage dishonesty.
- 8 In our example, they will underuse effort in applying fertilizer because effort reduces their utility.
- 9 For a fascinating case study, see Brown and Philips (1986).
- 10 We are considering here strategies of control within the firm. An alternative strategy is, of course, to subcontract the activity (to let it be organized through the price system).
- 11 See also Ouchi (1979) and Durkheim (1933).
- 12 Clark (1984) quotes the results of a number of studies comparing the hourly rates of pieceworkers vs. time workers in a number of occupations. Pieceworkers earned between 13 and 25 percent more than time workers. This cannot be due to self-selection, since firms using time rates have the possibility to fire least-efficient workers and to keep the most efficient ones.
- 13 A typical example of this is the recent case of an IRS employee who received bonuses linked to the percentage of tax-payer’s queries answered. He maximized it by systematically throwing out any query left unanswered by evaluation time. In terms of our model, the externalities generated by failing to constrain all aspects of behavior were probably greater than the reduction in shirking due to the use of market processes.
- 14 Intertemporal suboptimization is also a problem. Subsidiaries are not free-standing entities, and are not generally quoted on local stock markets. There is therefore no easy way to evaluate the impact of the subsidiary manager’s present decisions on the subsidiary’s future profit stream. If the manager is rewarded on the basis of annual profits, he can be expected to maximize present income at the expense of future profits by a variety of stratagems, such as cutting R & D budgets, or cutting employment and jeopardizing long-term government relations.
- 15 An exception is the work of Ouchi (1979, 1981). Ouchi pointed out that firms could either monitor the performance of their employees on the basis of behavior or on that of output. His explanation of the choice between these two modes is, however, different from the one used here. For him, “a bureaucratic form of organization succeeds because it replaces complete forms of contracting with a single incomplete contract, which is the employment contract” (Ouchi, 1981, p. 416). He does not make the link between shirking and cheating (see for example 1979, p. 836).
- 16 Eisenhardt (1985) found commission payments and straight salary to be substitute forms of compensating salesclerks.
- 17 Sometimes socialization is extended to the whole labor force. For example, Nissan spent \$ 63 million to send 383 employees of its U.S. assembly plant to see its Japanese operations and be indoctrinated in the company “way of doing things” (Lawrence, 1983).

- 18 In the 1890s, for example, when steamship travel from the U.K. to Australia took a month, the chief executive of the Australian subsidiary of the London-based Bank of Australasia ran his business with full autonomy. He was not asked to visit the London head office nor did he receive visits from London directors (Blainey, 1984).
- 19 Differences in tax rates between countries may make it advantageous to use transfer prices which differ from arm's length prices. As a result, a subsidiary's reported profits may diverge from its real profits. Rewarding managers on the basis of these reported profits will have strong disincentive effects. One solution is to keep two sets of books, one for the tax authorities, and the other to judge the profitability of the subsidiaries and to reward their managers. The latter record the profits obtained by using unbiased transfer prices (Brooke and Remmers, 1970).
- 20 See also Taylor and Silberston (1973, ch. 7).
- 21 Egelhoff finds a significantly positive correlation between output control and centralization, and no significant correlation between the extent to which subsidiaries are staffed with expatriates and both centralization and output control. The first set of results may be explained by the way output control is measured. The second set of findings may come from the difficulty of keeping the desired level of control constant when observing the mix of methods used to control foreign subsidiaries.

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Jean-François Hennart

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